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RESEARCH PAPER

Life form and geographical distribution of plants in Posthband region, Khonj, Fars Province, Iran

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Abstract: A study was conducted to identify plant species, diversity, life form and relevant species to Mediterranean climate, Irano-Torunian and Sahara-Sindian in Postband region (N 27°58'4"–28°2'16", E 53°17'34"–53°22'30"). In total, 95 species belonging to 29 families and 69 genera of flora were surveyed and identified from December 2006 to June 2008. Composite and Gramineae were important families in terms of species frequency. According to Raunkiaer's system and using $\hat{\chi}^2$ tests, the life-form spectrum showed that therophytes accounted for 47% of all species, and hemicryptophytes for 31%, phanerophytes for 12%, chamaeophyte for 7%, and cryptophytes for 3%. In geographical distribution, 29% species with the most frequency belonged to Irano-Torunian region. Results show that therophytes were more than normal spectrum and phaneropytes were less than normal spectrum, which was in agreement with data obtained in arid climate.

Keywords: geographical distribution; life form; Khalije-omani forest; Flora; Posthband

Introduction

The first classification of Iranian forests was done by Saei in 1942 (Marvi Mohadger 2005). He divided Iranian forests into six parts according to geographical zones and types of tree species (Marvi Mohadger 2005). Various classifications have been done by researchers (Jazireyi 1962; Tregubov and Mobayen 1991; Mossadegh 2005; Marvi Mohadger 2005). Marvi Mohadger (2005) classified Iranian forests based on ecological and geographical zones. In geographical classification, Iranian forests were divided into the following forests: Iranian north forest, Iranian west and west-south forests, Iranian central flat forest and south forest of Iran (Khalig-Omani sub region). Iranian south forests (Khalig-Omani sub region) belong to vegetation zone of Sahara-Sindianan. This zone has subtropical climate and temperate winter. Annual rainfall is 150 to 300 mm and most is in winter (Mossadegh 2005). The soil of the most areas in the zone is limy (Marvi Mohadger 2005). Investigated area is located at khonj forests with dominant species, *Zizphus spina* Christi that is considered as indicator of Khalig-Omani sub region (Assareh 2008). According to results from Box (1981), the study of plant life-forms is important for the following reasons: plant life-forms provide the basic structural components of vegetation stands and are the most obvious levels of subdivision for describing and explaining vegetation structure.

Plant species and individuals can be grouped into different life-form classes based on structural and functional similarities (Mueller-Dombois et al. 1974). A plant life form is usually understood as a growth form that displays an obvious relationship to key environmental factors (Mueller-Dombois et al. 1974). For example, mean annual temperature or precipitation (Mera et al. 1999) can be viewed as strategies for obtaining resources (Crosswhite et al. 1984).

Humboldt (1806) proposed 17 main forms, representing families or groups more or less analogous among themselves. Since then, several systems to group plants according to their growth habits were published (Duckworth et al. 2000). Raunkiaer (1934) proposed a classification system based on the position and degree of protection of the renewing buds, which were responsible for the renewal of the aerial plant body after the unfavorable season. According to this classification system, plant species can be grouped into five main classes: phanerophytes, chamaephytes, hemicryptophytes, cryptophytes and therophytes. Although sometimes strongly criticized (e.g., Sarmiento et al. 1983), Raunkiaer's system is still the simplest and, in many ways, the most satisfying classification system for plant life-forms (Begon et al. 1996). This system has been widely applied in many vege-

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tation types to classify plant species in life-forms, for example, deserts (Qadir et al. 1986; El-Demerdash et al. 1994; El-Ghani 1998), meadows (Beaman et al. 1966), Mediterranean vegetation (Dimopoulus et al. 1992; Christodoulakis 1996), prairies (Stalter et al. 1991), savannas (Cole et al. 1976; Sarmiento et al. 1983), temperate forests (Buell et al. 1948; Gao et al. 1998), tundra (Raunkiaer 1934), tropical grasslands (Shankar et al. 1991), tropical rain forests (Cain et al. 1956), and thorn woodlands (Carvalho de Costa et al. 2007).

There are a few investigations on plant life-forms and geographical distribution of Khalig-Omani sub region (Alaie et al. 2001; Nagafi et al. 2004, Attar et al. 2004, Soltani 2006, Mehrabian et al. 2008). Other vegetations in the sub region have been studied by many researchers (Zohary 1973; Kunkel 1977; Termeh et al. 1982; Assadi et al. 1983; Djavanshir 1999; Sabeti 2002). Phytogeography and identification of vegetation in a given area are essential to ecological researchers to assess current situation and to predict future status of the region. Therefore, study of flora conditions could be helpful in land use management decisions. Climatic types can be characterized by the prevailing plant life-forms in plant communities under a given climatic regime (Raunkiaer 1934; Cain 1950; Mueller-Dombois et al. 1974).

By identifying vegetation of a region, it is possible to access to the specific species characteristics, such as increasing or decreasing invasive and endangered species density in the region. The particular climate condition, drought, over-grazing, reduction in drug species in the study of area, Khonj, Iran provided enough reasons to study the flora of the region. This study was conducted to complete the flora studies in Iran.

Sahara-Sindian is one of the most important regions. Its phytogegraphic factors are very complex. Thus, the comparative study based on phytogeography and flora is essential for providing the basic information in ecosystem classification. Detailed floristic researches are the most important priority actions for Flora of Iran; thus these studies can be very useful for botanical gaps of Iran.

The objectives of this research were to determinating plant species and life forms of plant. Climate elements related to Mediterranean, Irano-Turanianan and Sahara-Sindianan were identified as well. Due to the fact that the research area is dry, this condition would be expected to high proportion of halophytes species. Also, because this area is the indicator of Khalig-Omani sub region, we expect that a high percentage of species will be related to Sahara-Sendianan growth zone.

Materials and methods

Posthband region with 4724.6-ha area is located in south of Iran (N 27°58'4"–28°2'16", E 53°17'34"–53°22'30"). The altitude in this region varies from 605 m to 1060 m above sea level. The mean annual rainfall and temperature were 216.2 mm and 23.4°C respectively. Most rainfall (78%) was concentrated between November and March. The flora was surveyed and identified from December 2006 to June 2008. The samples were pressed and transferred to the herbarium and recognized according to the Flora of Iran (Rechinger 1961–2001), Colored Flora of Iran (Ghahraman 1975–2005), Flora of west Pakistan (Nasir et al. 1970–2001), the Genus Astragalus in Iran (Maassoumi 1995; Ramak Masomi 1986) and Cormophytes of Iran (Ghahraman 1990). The distribution of plant species also was determined according to Mentioned Flora, Flora of Iran (Mobayen 1980–1996) and Ecogeographical study of the genus Hordeum (Akbarinia et al. 1994). Data were organized for listing the species, their families, and their life-forms and geographical distribution (All of these samples are deposited in Herbarium of forestry Department, University of Tehran). For determination of life forms, observations were made on aerial shoot reduction during unfavorably dry conditions. Species were classified as phanerophytes, chamaephytes, hemicryptophytes, cryptophytes, or therophytes according to Raunkiaer (1934). We computed the proportion of species in each life-form class, compared with Raunkiaer's normal spectrum using a $\hat{\chi}^2$ test. Then, we compared the ratio of herb to woody species in the case study with other Khalig-Omani study forests. For this comparison, therophytes, cryptophytes and hemicryptophytes were considered as herbs. Geographical distributions of species according to classification of vegetation zones were determined by Zohary (1963), Zohary (1973), Thankhtajon (1986) and Leonard et al. (1989).

Results

The 95 species from 69 genera and 29 families were recognized (Table 1). The families with the greatest number of species were Composite (22), Graminea (15), Papilionaceae (7), Cruciferae (5) and Zygophyllaceae (5). Thirteen families (13.5%) were represented by only a single species. The therophytes were the dominant life-forms, accounted for 47% of all species in the Posthband region, followed by hemicryptophytes (31%), phanerophytes (12%), camaephytes (7%) and cryptophytes (3%) (Table 2). The herbaceous flora (hemicryptophytes, cryptophytes and therophytes) comprised 77 species (81.05%), whereas the woody flora was represented by 19 species (18.94%), yielding a ratio of 4.27 between them (Table 3). The $\hat{\chi}^2$ test results showed that there is significant differences between the Posthband region flora and Raunkiaer’s normal spectra (p<0.05), (Table 4). Therophytes had the highest individual value from $\hat{\chi}^2$ test, followed by phanerophytes (Table 4).

Species geographical distribution showed that 27 species (29%) had a high proportion on Irano-Turanianan zone (Fig. 1). The 20 species (21%) belong to Sahara-Sendianan and Irano-Turanianan areas and 7 species (7%) belong to Sahara-Sendianan. In total, 54 species (56%) belong to Irano-Turanianan or Sandi-Sahara or both of them. The 64% species are distributed in Bi-or plurriregion. The 21% of total species are dominated in the Irano-Turanianan and Sahara-Sindianan, 10% of all species to Irano-Turanianan and Mediterranean and 12% of all species are belong to Irano-Turanianan and Sahara-Sendianan and Mediterranean, only 3% of species are cosmopolitan.

Table 1. List of species, families, their life-forms, and geographical distribution in the Posthband region, Khonj, Fars, Iran

Families	Species	Life form	Geographical distribution
Capparaceae	*Capparis spinosa* L.	Camaephytes	IT, SS, M
Caryophyllaceae	*Acanthophyllum spinosum* (Desf.) C. A. Mey.	Camaephytes	IT
Caryophyllaceae	*Dianthus macranthoides* Hausskn. ex Bornm.	Hemicryptophytes	IT, SS
Caryophyllaceae	*Sclerocephalus arabicus* Boiss.	Therophytes	SS, M
Chenopodiaceae	*Chenopodium album* L.	Therophytes	Cosm.
Chenopodiaceae	*Halocnemum strobilaceum* M. B.	Camaephytes	IT, SS, M
Chenopodiaceae	*Salsola imbricata* Forssk.	Therophytes	SS
Chenopodiaceae	*Salsola lanta* Pall. *subsp. Lanta*	Therophytes	IT, SS
Composite	*Achillea wilhelmsii* C. Koc.	Hemicryptophytes	IT, ES
Composite	*Anthemis tinctoria* L.	Hemicryptophytes	IT
Composite	*Calendula persica* C. A. Mey.	Therophytes	IT, SS
Composite	*Carthamus oxyacantha* M. B.	Therophytes	IT, SS, M
Composite	*Centaurea bruguieriana* (DC.) Hand.- Mzt.	Therophytes	IT, SS
Composite	*Centaurea iberica* Trev. ex Spreng.	Hemicryptophytes	IT, M
Composite	*Cichorium intybus* L.	Hemicryptophytes	IT, M, ES
Composite	*Cichorium pumilum* Jacq.	Therophytes	IT
Composite	*Echinops dichorus* Boiss. & Haussk.	Hemicryptophytes	IT, SS
Composite	*Echinops gedrosiacus* Bornm.	Hemicryptophytes	IT, SS
Composite	*Gundelia tournefortii* L.	Hemicryptophytes	IT
Composite	*Gymnarrhena micrantha* Desf.	Hemicryptophytes	IT, SS
Composite	*Koelpinia tenuissima* Pavl. & Lipsch.	Therophytes	IT
Composite	*Lasiopogon muscoides* (Desf) DC.	Therophytes	IT, SS
Composite	*Lapsana communis* L.	Hemicryptophytes	IT, ES
Composite	*Lactuca glauciifolia* Boiss.	Hemicryptophytes	IT, SS
Composite	*Onopordon leptolepsis* DC.	Hemicryptophytes	IT, SS
Composite	*Senecio flavus* (Dence.) Schultz-Bip.	Therophytes	IT, SS
Composite	*Senecio vulgaris* L.	Therophytes	IT, ES
Composite	*Senecio glaucus* L.	Therophytes	IT, SS, M
Composite	*Tanacetum parthenium* (L.) Schultz-Bip.	Hemicryptophytes	IT
Convolvulaceae	*Taraxacum persicum* V. S.	Hemicryptophytes	IT
Crassulaceae	*Convolvulus spinosus* Burm.	Phanerophytes	IT, SS
Cruciferae	*Umbilicus intermedius* Boiss.	Cryptophytes	IT, SS, M
Cruciferae	*Alyssum linifolium* Steph ex Willd.	Therophytes	IT, SS, M, ES
Cruciferae	*Clypeola microcarpa* Moris.	Therophytes	IT, M, ES
Cruciferae	*Conringia persica* Boiss.	Therophytes	IT
Cruciferae	*Malcolmia aficana* (L.) R. Br.	Therophytes	IT, SS, M
Cucurbitaceae	*Sinapis arvensis* L.	Therophytes	IT, SS, M
Dipsaceae	*Citrullus colocynthis* (L.) Schrad.	Hemicryptophytes	SS, M
Fumariacea	*Cephalaria microcephala* Boiss.	Hemicryptophytes	IT
Fumariacea	*Fumaria vaillantii* Loisel.	Therophytes	IT, M, ES
Gramineae	*Fumaria parviflora* Lam.	Therophytes	IT, M, ES
Gramineae	*Aegilops kotschyi* Boiss.	Therophytes	IT, SS
Gramineae	*Avena barbata* Pott ex Link.	Therophytes	IT, M
Gramineae	*Avena ludoviciana* Durieu.	Therophytes	IT, M
Gramineae	*Avena wiestii* Steud.	Hemicryptophytes	IT
Gramineae	*Bromus dantoniae* Trin.	Therophytes	IT
Gramineae	*Bromus gracillimus* Bge. = *Bromus inermus* Leyss.	Therophytes	IT
Gramineae	*Bromus rubens* L.	Therophytes	IT, ES
Gramineae	*Bromus tectorum* L.	Therophytes	Cosm.
Gramineae	*Bromus tomentellus* Boiss.	Cryptophytes	IT
Gramineae	*Festuca ovina* L.	Hemicryptophytes	IT, M, ES
Gramineae	*Heteranthelium piliferum* (Banks & Soland.) Hochst.	Therophytes	IT
Gramineae	*Hordeum leporinum* Link.	Therophytes	IT, M
Gramineae	*Hordeum spontaneum* C. Koch.	Therophytes	IT, M, ES
Gramineae	*Stipa capensis* Thunb.	Therophytes	IT, SS, M
Gramineae	*Stipa hohenackeriana* Trin & Rupr.	Hemicryptophytes	IT
Geraniaceae	*Erodium gruinum* (L.) L' Her. ex Aiton.	Therophytes	IT, M
Labiatae	*Teucrium orientale* L. *subsp. oriental*	Hemicryptophytes	IT, SS
Labiatae	*Zataria multiflora* Boiss.	Camaephytes	IT, SS
Labiatae	*Phlomis olivieri* Benth.	Hemicryptophytes	IT
Liliaceae	*Allium Borszczowii* Regel.	Therophytes	IT
Liliaceae	*Allium eriophyllum* Boiss.	Cryptophytes	IT, SS
Malvaceae	*Malva parviflora* L.	Therophytes	IT, M

Continued Table 1

Families	Species	Life form	Geographical distribution
Mimosaceae	*Prosopis stephaniana* (Willd) Kunth.	Phanerophytes	SS
Papilionaceae	*Alhagi mannifera* Desf.	Hemicryptophytes	IT, SS, M
Papilionaceae	*Astragalus ajubensis* Bge.	Hemicryptophytes	IT
Papilionaceae	*Astragalus bakaliensis* Bge.	Therophytes	IT
Papilionaceae	*Astragalus arbusculinus* Bornm. et Gauba. *Syn: Astragalus fasciculifolius* Boiss.	Phanerophytes	IT, SS
Papilionaceae	*Astragalus glaucacanthus* Fisch.	Phanerophytes	IT
Papilionaceae	*Medicago scotellata* Mill.	Therophytes	IT, M
Papilionaceae	*Ononis spinosa* L.	Therophytes	IT
Plantaginaceae	*Plantago evacina* Boiss.	Therophytes	IT
Plantaginaceae	*Plantago lanceolata* L.	Therophytes	IT, SS, M
Plantaginaceae	*Plantago maritime* L.	Hemicryptophytes	IT, M
Plantaginaceae	*Plantago ovata* Forssk.	Therophytes	IT, SS, M, ES
Plumbaginaceae	*Acantholimon acmostegium* Bloss. & Buhse.	Camaephytes	IT
Polygonceae	*pteropyrum aucheri* Jaub. & Spach.	Phanerophytes	IT
Polygonceae	*Rumex vesicarius* L.	Therophytes	SS, M
Resedaceae	*Reseda aucheri* Boiss.	Hemicryptophytes	IT, SS
Resedaceae	*Reseda luteola* L.	Hemicryptophytes	IT, SS, M, ES
Rhamnaceae	*Ziziphus spina christii* (L.) Willd.	Phanerophytes	SS
Rhamnaceae	*Ziziphus nammularia* Wight. & Arn	Phanerophytes	SS
Rosaceae	*Amygdalus lycioides* Spach.	Phanerophytes	IT
Rosaceae	*Amygdalus arabica* Olivier.	Phanerophytes	IT
Rubiaceae	*Gaillonia aucheri* Jaub. & Spach.	Camaephytes	SS
Rubiaceae	*Galium setaceum* Lamk.	Therophytes	IT, M
Salvadoraceae	*Salvadora persica* L.	Phanerophytes	SS
Scrophulariaceae	*Veronica campylopoda* Boiss.	Therophytes	IT, ES
Tiliaceae	*Corchorus depressus* (L.) Stocks.	Camaephytes	Cosm.
Umbelliferae	*Daucus carota* L. *subsp. carota*	Therophytes	IT
Zygophyllaceae	*Fagonia bruguieri* DC. *var bruguieri*	Hemicryptophytes	IT, SS
Zygophyllaceae	*Fagonia indica* Burm. f. *var indica*	Hemicryptophytes	SS
Zygophyllaceae	*Peganum harmala* L.	Hemicryptophytes	IT, SS, M
Zygophyllaceae	*Tribulus terrestris* L.	Therophytes	IT, SS, M, ES
Zygophyllaceae	*Zygophyllum eurypterum* Boiss. & Buhse.	Phanerophytes	IT, SS

Notes: Geographical distribution: M is Mediterranean, IT is Irano-Turanianan, SS is Sahara-Sendiananan, ES is Euro-Siberian and Cosm. is cosmopolitan.

Table 2. Life-form percentage of plants in Posthband region

Item	Phanerophytes(%)	Camaephytes(%)	Hemicryptophytes(%)	Cryptophytes(%)	Therophytes(%)
Percentage of plant species	12	7	31	3	47

Table 3. Comparison of different items in the study area and other regions of Khalig-Omani forest

References	Location	Dominant Geographical distribution	Annual rainfall (mm)	Main annual temperature (°C)	Dominant life form	Woody species (%)	Herbaceous species (%)	Herbaceous species (%)	Ratio of herb/woody (%)
This study	Posthband region	Irano-Turanianan	216.20	23.40	Th (47%)	18.94	81.05	81.05	4.27
Nagafi et al. (2004)	Genu Protected area	Irano-Turanianan	319.00	26.80	Th (43.3%)	25.50	74.50	74.50	2.92
Alaie & Ghahreman (2001)	the Oil Field Areas	Sahara-Sendiananan	184.00-430.00	25- 27.6	Th (55.5%)	16.57	83.43	83.43	5.03
Attar et al. (2004)	Qeshm Island	Sahara-Sendiananan	183.2	25.75	Th (48.9%)	29.28	70.71	70.71	2.41
Soltani Poor (2006)	Hormoz Island	Sahara-Sendiananan	under 200.00	About 25.00	Th (47.6%)	31.50	68.50	68.50	2.17
Mehrabian et al. (2008)	Mond protected area	Sahara-Sendiananan	155.00	15.1	Th (56.7%)	28.50	71.50	71.50	2.50

Table 4. Results of $\hat{\chi}^2$ tests of the Posthband region and Raunkiaer's normal spectra

Regions	Ph	Ch	H	Cr	Th	Total
Posthband region, Khonj, Fars, Iran (No. of species)	11.00	7.00	29.00	3.00	45.00	95.00
Posthband region, Khonj, Fars, Iran (% of species)	12.00	7.00	31.00	3.00	47.00	100.00
Raunkiaer's normal spectrum (% of species)	46.00	9.00	26.00	6.00	13.00	100.00
$\hat{\chi}^2$	96.33	0.57	0.80	3.00	24.60	125.30

Notes: Ph is phanerophytes, Ch is camaephytes, H is hemicryptophytes, Cr is cryptophytes, Th is therophytes.

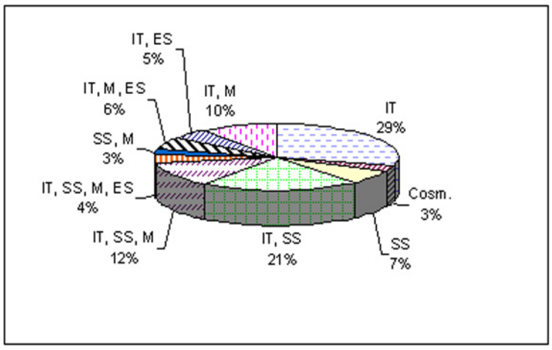

Fig. 1 Geographical distribution percentage of plants in Posthband region. Geographical distribution: M is Mediterranean, IT is Irano-Turanianan, SS is Sahara-Sendiananan, ES is Euro-Siberian and Cosm. is cosmopolitan

Discussion

In this study, Raunkiaer (1934) classification system was used for determination of plant life-forms in Posthband region. According to Raunkiaer's system, as well as data from literature, it would be expected that plant communities in areas with low annual rainfall levels and high mean temperatures would have a high proportions of species in life-form classes (mainly halophytes), (Table 2). The 47% of total plants in the study area are dominated by halophytes, which is consistent with the result of Soltanipor (2006) and Nagafi et al. (2004). The predominance of therophytes reflects an effective strategy for avoiding water losses due to humidity extremes and water deficiencies (Van Rooyen et al. 1990). The importance of therophytes increases with decreases of rainfall (Raunkiaer 1934; Kovács-Lang et al. 2000). Difference in amount of phanrophytes and therophytes in this region with Raunkiaer normal spectrum is too much and this may be a result of dryness of this region. With regards to $\hat{\chi}^2$ test, Rankiaer normal spectrum has significant difference with the amount of halophytes and phanrophytes while the differences between amount of camaephytes, cryptophytes and hemicryptophytes are not significant.

The amount of phanrophytes in this study are less than that of Raunkiaer normal spectrum and this may be related to dryness of region. The low percentages of cryptophytes and camaephytes show that they are not adapted to hodiernal climate situations. Therophytes are annual plants that their perennating bud is helding in the embryo seed, through the unfavorable season. These plants represent the most protection to the renewal tissues (Raunkiaer 1934; Cain 1950). Low rainfall levels, high temperature, drought and short growing season are the most important factors in the dominant of therophytes (Raunkiaer 1934; Cain 1950). Other factors in dominant of therophytes are the destruction factors (over-grazing and agriculture) in the region. Because of over-grazing, the percentage of therophytes was increased through the introduction and spread of weedy grasses and forbs of this life-form (Cain 1950).

When species richness is compared among different studies (Table 3), it can be seen that the ratios of herbaceous (halophytes, cryptophytes and hemicryptophtes) to woody (phonrophytes and camaephytes) species are quite variable. With low annual rainfall levels and high mean temperatures, it would be expected that the proportion of herbaceous species became more than that of woody species. In Hormoz Island, Qeshm Island and Mond protected area with lower rainfalls, the proportion of herbaceous species to wooden is lower than that in other regions. This is a result of especial conditions of those regions, due to being high moisture of air. It means that changes of the herbaceous ratios to woody species depend on the climates condition, soil and microclimate. In the Hormzs and Qeshm Islands and Mond protected area, the amount of rainfall is lower while the amount of moisture in weather is more. Considering the climate conditions of Oil Field Areas (for example, moisture of air, annual rainfall and mean temperature), we expected that the proportion of woody species in the region is higher than others. In Table 3, the proportion of woody species in the Oil Field Areas is the highest of all.

In all studies in Khalig-Omani sub region, halophytes are the most abundant life-forms (Table 3). According to Cain (1950), halophytes are particularly abundant in desert climates and in weed communities where native vegetation is disturbed.

The geographical distribution of plants reflects the climate condition (Mobayen 1991). Considering this fact that most species of this region are Irano-Turanianan elements, we can conclude that this region belongs to Irano-Turanianan growth zone. But, plant physiognomi types of this region showed that the Sahara-Sendianan growth zone was fragmented and the determination of boundary between Sahara-Sindianan growth zone and Irano-Turanianan was very difficult (Zohary 1973). It is concluded that that study area is defined to the Sahara-Sindianan growth zone that growth elements of Irano-Turanianan have got into (because of Sahara-Sendianan zone fragmentation). Also according to results of this study, it can be concluded that the research area is located in Ecoton region.

In Khalig-Omani sub region, the most proportion of plants belongs to Sahara-Sendiananan vegetation zone (Table 3). In the Posthband region and Genu protected area, plants belonging to Irano-Turanianan vegetation zone are the most common. Genu protected area is in a varying altitude between 50 and 2347 m above sea level (Najafi et al. 2002). Marvi Mohadger (2005) concluded that every 100-meter increase in the height is equal to one degree increase in altitude. The characteristic of Genu protected area is similar to that of Irano -Turanianan vegetation zone, which is due to high altitude.

In the researches (Soltanipor 2006; Nagafi et al. 2004), Gramineae, Composite and Papilionaceae were considered as the most important plant families in Khalig-Omani sub region (or Sahara-Sendianan). Frequency of these plants may be related to Sodis-soils and the high percentage of vegetation destruction of this region (Kashipazha et al. 2004).

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